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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,585	07/17/2003	Jae-Young Ahn	5649-1119	2601

20792 7590 06/24/2005

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EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT PAPER NUMBER

1763

DATE MAILED: 06/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/621,585

Applicant(s)

AHN ET AL.

Examiner

Jeffrie R. Lund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-18, drawn to a deposition apparatus, classified in class 118, subclass 715.
  - II. Claims 19 and 20, drawn to deposition method, classified in class 427, subclass 248.1.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions of Group II and Group I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process such as etching.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Scott Hatfield on June 14, 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-18. Affirmation of this election must be made by applicant in replying to this Office action. Claims 19 and 20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Information Disclosure Statement***

6. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

7. The information is required to enter in the record the art suggested by the applicant as relevant to this examination, specifically, the Korean publication 10-1992-0001543 and its English translation. The English abstract of 10-1992-0001543 was filed in the IDS of September 2, 2004. The Examiner needs the complete publication to fully determine the scope of the teachings suggested by the English abstract.

8. The fee and certification requirements of 37 CFR 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 CFR 1.105 are subject to the fee and certification requirements of 37 CFR 1.97.

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9. The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

10. This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 1, and 16-18 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Korean Patent Application 10-1992-0001543 ('1543).

The claims are taught by '1543 in the English abstract.

13. Claims 1, 12, 13, 16, and 17 rejected under 35 U.S.C. 102(e) as being anticipated by Sandhu et al, US Patent 6,499,425 B1.

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Sandhu et al teaches a CVD apparatus that includes a processing chamber 201; a susceptor 204 for holding a substrate 206; and a shower head 210 comprising a housing 342, a first inlet port 238 supplying a gas to a first plenum 228, a second inlet port supplying a second gas into a second plenum 230, a spray plate 234, and a wire heating element 222 attached to the first plenum of the showerhead. (Entire documents, specifically, figures 9-12 and column 8 lines 42-67) The apparatus of Sandhu et al can inherently perform ALD.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 1, 12-14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohashi et al, US Patent 6,059,885, in view of Sandhu et al, US

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Patent 6,499,425 B1.

Ohashi et al teaches a CVD apparatus that includes: a processing chamber; a susceptor 712 holding a substrate 711; and a showerhead having a first plenum S receiving a first gas, and a second plenum 719 receiving a second gas. The first plenum extends further from the process chamber than the second plenum. (Figure 7)

Ohashi et al differs from the present invention in that Ohashi et al does not a gas heater in the first plenum.

Sandhu et al, as discussed above, teaches a gas heater in a first plenum of a showerhead.

The motivation for adding the gas heater of Sandhu et al to the apparatus of Ohashi et al is to heat and partially ionize the gas prior to its entry into the processing chamber as taught by Sandhu et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the gas heater of Sandhu et al to the apparatus of Ohashi et al.

17. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohashi et al and Sandhu et al as applied to claims 1, 12-14, 16, and 17 above, and further in view of Arami et al, US Patent 5,958,140.

Ohashi et al and Sandhu et al differ from the present invention in that they do not teach that the sidewalls of the showerhead are cooled.

Arami et al teaches a showerhead with cooled sidewalls 47. (Figure 2)

The motivation for adding the cooling means of Arami et al to the apparatus of

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Ohashi et al and Sandhu et al is to maintain the showerhead at a specific temperature.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the cooling means of Arami et al to the apparatus of Ohashi et al and Sandhu et al.

18. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohashi et al and Sandhu et al as applied to claims 1, 12-14, 16, and 17 above, and further in view of Asano et al, US Patent 6,863,732 B2.

Ohashi et al and Sandhu et al differ from the present invention in that they do not teach a boat supporting a plurality of substrates.

Asano et al teaches a coating device 1 using a showerhead 31c and supporting the substrates W on a boat 4. (Figure 2)

The motivation for adding the boat of Asano et al to the apparatus of Ohashi et al and Sandhu et al is to enable the apparatus of Ohashi et al and Sandhu et al to process a plurality of substrates in a single batch thus improving throughput.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the boat of Asano et al to the apparatus of Ohashi et al and Sandhu et al.

19. Claims 1-3, 6, 7, 12-13, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook et al, US Patent 6,352,594 B2, in view of Sandhu et al, US Patent 6,499,425 B1.

Cook et al teaches a CVD apparatus that includes: a processing chamber 42; a wafer boat 40 holding a plurality substrates 56; a showerhead 78 configured to spray



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the reaction gas parallel to the substrates, having a housing 80 with a first plenum 88 receiving a first gas via an inlet port 84, a second plenum 90 receiving a second gas via an inlet port 86, a spray plate 94, and a cooling channel. (Figure 7)

Cook et al differs from the present invention in that Cook et al does not a coiled wire gas heater in the first plenum and connected to a terminal.

Sandhu et al, as discussed above, teaches a gas heater in a first plenum of a showerhead.

The motivation for adding the gas heater of Sandhu et al to the apparatus of Cook et al is to heat and partially ionize the gas prior to its entry into the processing chamber as taught by Sandhu et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the gas heater of Sandhu et al to the apparatus of Cook et al.

20. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook et al and Sandhu et al as applied to claims 1-3, 6, 7, 12-13, and 16-18 above, and further in view of Yamanaka et al, US Patent 6,653,212 B1.

Cook et al and Sandhu et al differ from the present invention in that they do not teach that the coiled heating ware is made from tungsten.

Yamanaka et al teaches a coil wire heater 5 made of tungsten. (Figure 1, column 5 lines 12-21)

The motivation for making the wire heater of Cook et al and Sandhu et al out of tungsten is to provide a material of construction as taught by Yamanaka et al.

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Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the wire heater of Cook et al and Sandhu et al out of tungsten as taught by Yamanaka et al.

21. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook et al and Sandhu et al as applied to claims 1-3, 6, 7, 12-13, and 16-18 above, and further in view of Japanese Patent 2003-142234 ('234).

Cook et al and Sandhu et al differ from the present invention in that they do not teach that the terminal is elastic and insulates the terminal from the housing.

'234 teaches a terminal (adapter) 3 with an insulating layer 7 and elastic sealant 8 that connects a power source to an electric heating wire 2. (Abstract, and figure 1)

The motivation for adding the terminal means of '234 to the apparatus of Cook et al and Sandhu et al is to provide a specific terminal means for mounting the wire heater as required by Cook et al and Sandhu et al but not described.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the terminal means of '234 to the apparatus of Cook et al and Sandhu et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

22. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook et al and Sandhu et al.

Cook et al and Sandhu et al differ from the present invention in that they do not

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teach that the terminal is elastic and insulates the terminal from the housing.

Ceramic (electrically insulating) spring load (elastic) terminals are well known in the art and commonly used to mount wires for various purposes. Examples of these terminals can be seen in halogen lighting systems.

The motivation for adding a specific terminal means to the apparatus of Cook et al and Sandhu et al is to provide a means for mounting the wire heater as required by Cook et al and Sandhu et al but not described.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the terminal means of '234 to the apparatus of Cook et al and Sandhu et al.

23. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook et al and Sandhu et al as applied to claims 1-3, 6, 7, 12-13, and 16-18 above, and further in view of Arami et al, US Patent 5,958,140.

Cook et al and Sandhu et al differ from the present invention in that they do not teach that the sidewalls of the showerhead are cooled.

Arami et al teaches a showerhead with cooled sidewalls 47. (Figure 2)

The motivation for adding the cooling means of Arami et al to the apparatus of Cook et al and Sandhu et al is to maintain the showerhead at a specific temperature.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the cooling means of Arami et al to the apparatus of Cook et al and Sandhu et al.

24. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable

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over Cook et al, Sandhu et al, and Arami et al as applied to claims 1-3, 6-9, 12-13, and 16-18 above, and further in view of Ohashi et al, US Patent 6,059,885.

Cook et al, Sandhu et al, and Arami et al differ from the present invention in that they do not teach that the first plenum extends further from the processing chamber than the second plenum.

Ohashi et al was discussed above and includes a first plenum S extends further from the processing chamber than the second plenum 719.

The motivation for adding the motivation for elongating the first plenum in the apparatus of Cook et al, Sandhu et al, and Arami et al is to provide a specific shape for the plenums as taught by Ohashi et al. Furthermore, it has been held that a change in shape is a matter of choice which a person of ordinary skill in the art would have found obvious. (See *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) MPEP 2144.04(d))

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to elongate the first plenum of Cook et al, Sandhu et al, and Arami et al as taught by Ohashi et al.

### ***Conclusion***

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art teaches the technological background of the invention. The cited art contains patents that could be used to reject the claims under 35 USC § 102 or 103. These rejections have not been made because they do not

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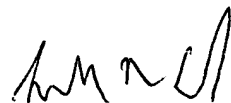
provide any additional or different teachings, and if they were applied, would have resulted in an undue multiplication or references. (See MPEP 707.07(g))

26. This Office action has an attached requirement for information under 37 CFR 1.105. A complete reply to this Office action must include a complete reply to the attached requirement for information. The time period for reply to the attached requirement coincides with the time period for reply to this Office action.

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrie R. Lund  
Primary Examiner  
Art Unit 1763